ABSTRACT OF THE DISCLOSURE

Disclosed are techniques, apparatus, and targets for determining overlay error between two layers of a sample. In one embodiment, a method for determining overlay between a plurality of first structures in a first layer of a sample and a plurality of second structures in a second layer of the sample is disclosed. Targets A, B, C and D that each include a portion of the first and second structures are provided. Target A is designed to have an offset Xa between its first and second structures portions; target B is designed to have an offset Xb between its first and second structures portions; target C is designed to have an offset Xc between its first and second structures portions; and target D is designed to have an offset Xd between its first and second structures portions. Each of the offsets Xa, Xb, Xc and Xd is preferably different from zero; Xa is an opposite sign and differ from Xb; and Xc is an opposite sign and differs from Xd. The targets A, B, C and D are illuminated with electromagnetic radiation to obtain spectra S_A, S_B, S_C, and S_D from targets A, B, C, and D, respectively. Any overlay error between the first structures and the second structures is then determined using a linear approximation based on the obtained spectra S_A, S_B, S_C, and S_D.